FACULTY OF BIOSCIENCE ENGINEERING

RESEARCH GROUP AQUATIC ECOLOGY

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FINE-SCALE DYNAMICS IN REEF FISH ASSEMBLAGES: IMPLICATIONS FOR MONITORING

Background

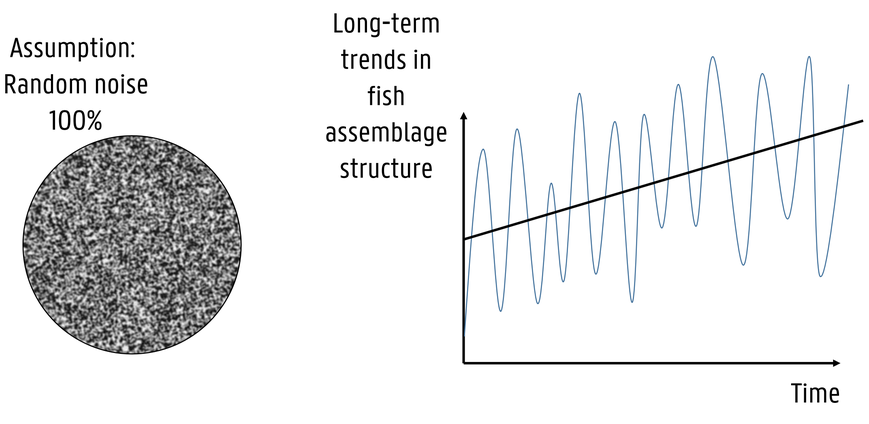
- Fine scale dynamics in reef fish assemblage composition are often not accounted for in sampling designs
- Fine-scale spatial and temporal differences have been found to be important, but proper assessments have been limited
- Unaccounted fine-scale dynamics limit the power of climate change models and ecological impact assessment studies

Research questions

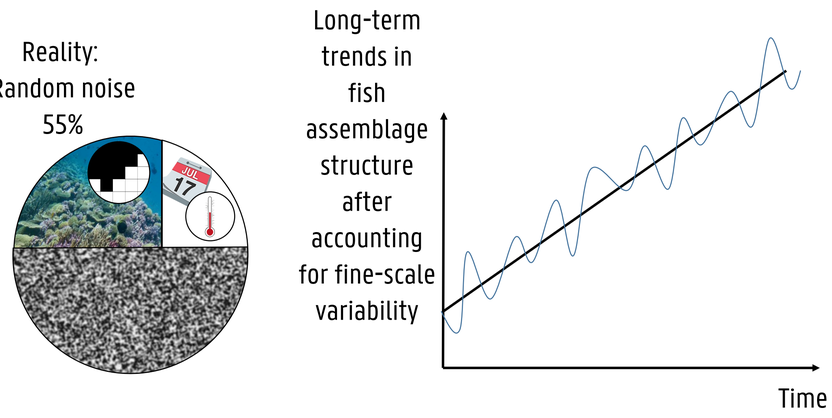
- How important are fine-scale spatial and temporal dynamics for a reef fish assemblage?
- What are the driving forces behind these fine-scale dynamics?
- Wat are the implications for monitoring?

Implications of fine-scale dynamics for broad-scale models

- No fine-scale dynamics in broad-scale models



- Fine-scale dynamics in broad-scale models



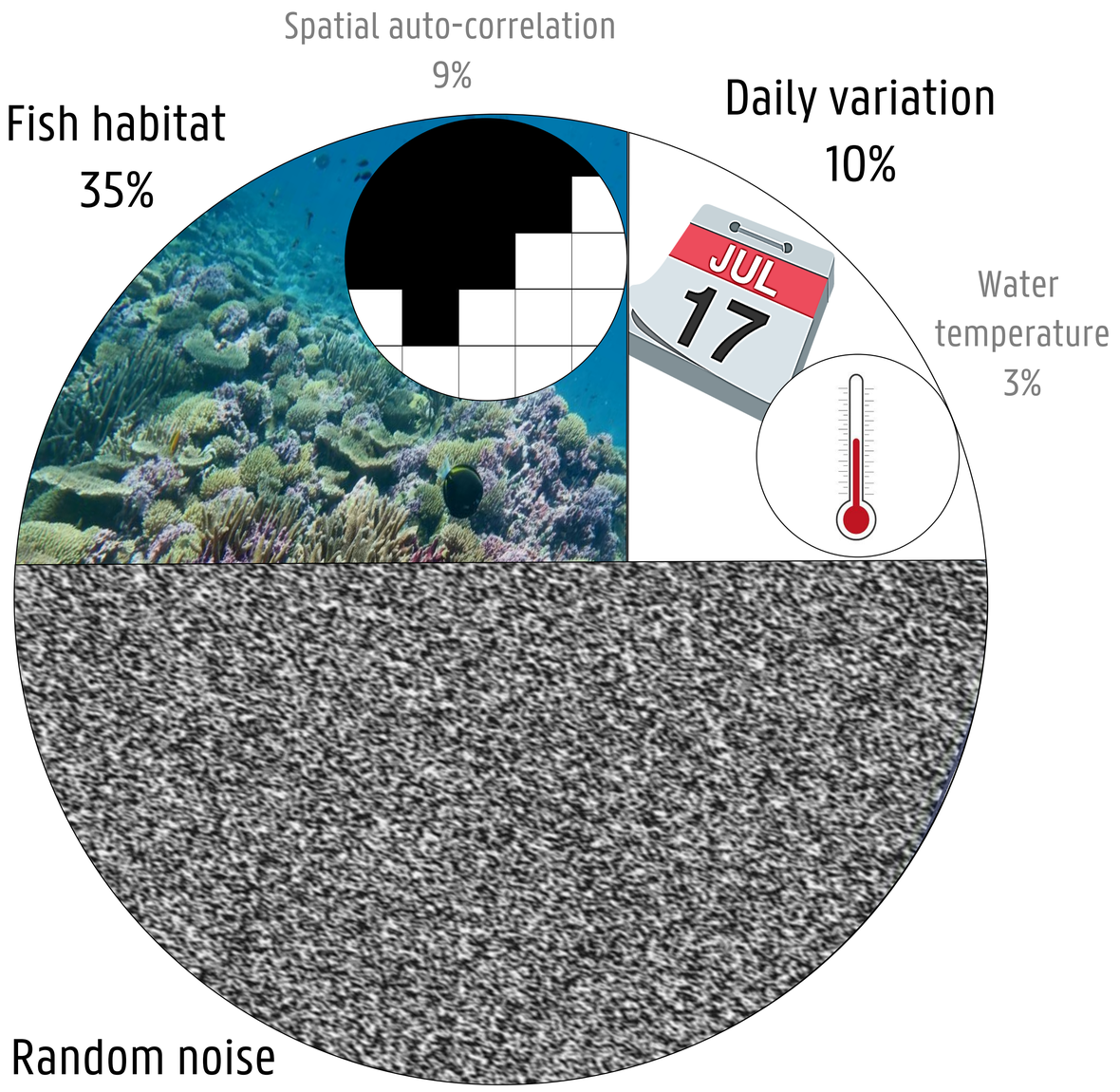
- Accounting for fine-scale variability in broad-scale models
  - Lower sampling error and reduced risk of systematic bias
    - Improved broad-scale models

Methods

- Study area: Rocky shores of Santa Cruz island, Galapagos
- Sampling technique: Fixed video transects
- 5 transect x 5 days x 4 moments per day (1 hour difference)

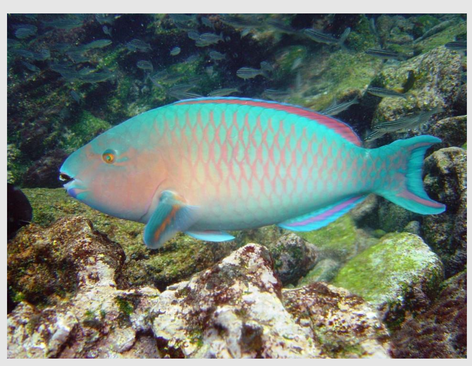
Results

Identification and quantification of the drivers behind fine-scale variability in reef fish assemblage structure



Conclusions

- On a fine scale (1 week, 1 ha), fish habitats, spatial auto-correlation and daily variation are important to consider when deciding on the sampling design and sampling effort
  - Multiple transects and sound habitat classification protocols are necessary
  - Daily variations might mask long-term trends: Including some moments of intensive sampling during the study period will give a better idea of fine-scale patterns and the actual broad-scale patterns
- Tidal and diel variations are limited, hence samples taken within the same location within a few hours of difference can be treated as repeats
- Unlike the structure of fish assemblages, water conditions vary more strongly within days than between days, suggesting a limited effect of water conditions on fish assemblage structure all together



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All methods were carried out in accordance with the relevant guidelines and regulations of the Galapagos National Park Directorate under research permit PC-02-19. All experimental protocols were reviewed and approved by the Galapagos National Park Directorate Applied Research Department, which assesses animal care in research activities.

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